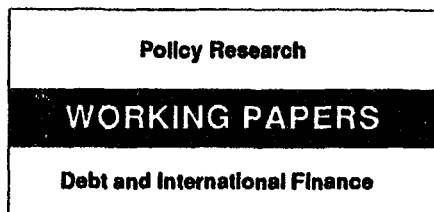


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The Pricing of Country Funds and Their Role in Capital Mobilization for Emerging Economies

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Country funds traded in the developed capital markets can help promote the efficiency of pricing in the emerging capital markets and can enhance capital mobilization by local firms.

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Diwan, Errunza, and Senbet theoretically analyze country funds, focusing on emerging economies in which capital markets are not readily accessible to outside investors. They study country-fund pricing and the associated policy implications under alternative variations on segmentation of international markets.

They show that country funds traded in the developed capital markets can help promote the efficiency of pricing in the emerging capital markets and can enhance capital mobilization by local firms. These efficiency gains vary depending on the degree of the international investor's access to the emerging market securities (access effect), on the degree to which the industrialized countries' securities market span the securities offered in the emerging markets (substitution effect), and on the existing cross-border arbitrage restrictions.

As a byproduct of their analysis, they study the reasons why country funds sell at a premium or discount relative to their net underlying asset

value. They also show that the efficiency gains that arise with the development of new funds can be positive even when these funds start trading at a discount.

They conclude with a catalog of policy implications, including strategies for efficiently promoting country funds. For example:

- In general, introducing the country fund in the advanced or developed market increases the prices of the underlying component assets traded in the originating emerging markets.
- As a policy matter, country funds that should be encouraged by emerging countries for introduction by fund promoters should be targeted to those local assets with imperfect or no substitutes in the advanced core markets.
- In some circumstances, it may be socially optimal to subsidize the introduction of new funds that are expected to sell at a discount.

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**THE PRICING OF COUNTRY FUNDS AND THEIR ROLE IN
CAPITAL MOBILIZATION FOR EMERGING ECONOMIES**

by

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framework, we link the pricing of country funds in the reference or core markets (say the US) with the pricing of the component underlying assets (or net asset valuation) in the originating securities markets. We study various scenarios of international capital market structure and draw important implications for the role of country funds in enhancing pricing efficiency in the local securities markets and capital mobilization by local firms. Pricing efficiency is determined by the impact of the introduction of country funds on the prices of the component assets traded in local markets, and capital mobilization is determined by the impact on costs of capital facing local firms. The effects vary depending on the market segmentation structures considered. Moreover, we show that the existence of premia and discounts on the country funds depend on the nature of market segmentation and arbitrage restrictions.

There are also important policy implications to be drawn from our analysis. Country funds should obviously be encouraged under those conditions where they contribute to capital mobilization and pricing efficiency in the originating capital markets and economies. However, not so obvious, we show that these efficiency gains from country funds can be achieved despite their relatively small size. This is important, because it may be tempting to dismiss the role of country funds as insignificant due to their small size relative to other external sources of funds. Indeed, the indeterminacy of size is desirable for those emerging countries which are concerned about extensive foreign ownership and about the

THE PRICING OF COUNTRY FUNDS AND THEIR ROLE IN CAPITAL MOBILIZATION FOR EMERGING ECONOMIES

I. Introduction

Closed-end national index funds (hereinafter "country funds") primarily invest in the stocks of the issuing or originating countries, such as India, Korea, Brazil, and are typically traded in the organized exchanges of the developed countries, such as the US and the UK. Country funds have expanded phenomenally over the recent past (see Figure 1), but they beg important issues

Figure 1

which are not sufficiently explored. Of particular interest to us is their role in providing pricing efficiency in the originating stock markets of emerging economies and enhancing capital mobilization by local firms of such economies. The issues of pricing efficiency and local capital mobilization are of first-order importance, since country funds themselves remain a very small fraction of the stock of external capital available to emerging economies.¹

Our purpose here is to provide a theoretical analysis of country funds focusing on emerging economies whose capital markets are not readily accessible to outside investors. In a sequel paper we provide an empirical analysis. By utilizing a segmented markets

¹For instance, the total initial values of US-listed funds from Brazil, Chile, and Mexico were about US \$150, 80.5, and 266.7 million compared to \$118.7, 19.4, and 100.4 billion, respectively, of total external debt at the end of 1988.

destabilizing effects of "hot money". Also, our analysis calls into question attempts to focus on widely traded securities (or "blue chips") in devising country funds, to the extent that these securities are spannable by the international market, because the greatest impact of the country fund comes from those securities which lack ready substitutes in the core market. We point out strategies for promoting desirable characteristics of country funds as a byproduct of the analysis.

In drawing various implications, we look at three variations of market segmentation structure and arbitrage restrictions. One relatively clean case of market structure that we consider introduces capital inflow restrictions by emerging countries that originate country funds, whereby the originating capital markets are restricted to local investors, but that these investors are allowed to arbitrage freely between their markets and the core or the reference markets in which country funds are traded. We show in this case that there will be no premium or discount on the country fund. However, the prices of component assets traded in the originating markets will be bid up to the level of the country funds, resulting in pricing efficiency and enhanced ability of firms to raise capital at more favorable terms (or at reduced costs of capital). We then consider the case of capital inflow and prohibitive restrictions on international arbitrage restriction resulting from such factors as absence of short sales opportunities, taxes, borrowing constraints, and other investment barriers. In this case, there will be a premium on the country

fund, and the pricing of the country fund conforms to the core market rather than the originating country.

In both of the above scenarios we assume that the country fund serves as a perfect substitute for the component securities, but, in fact, that may not be the case for a number of emerging countries. This notion of imperfect substitution is reinforced by a plot of time series pattern of country funds prices and the corresponding net asset values as depicted in Figure 1. This motivates our third scenario where we now allow the possibilities of imperfect substitution and imperfect arbitrage.

Figure 2

We show that an interaction between the positive effect of enhanced access and the negative effect of imperfect substitution delivers premium or discount on the country fund, depending on the tradeoff. Interestingly, though, the existence of a discount or premium in itself cannot establish whether or not the introduction of the country fund is welfare improving from the standpoint of emerging economies. We show that efficiency gains are possible even in this intermediate case of imperfect substitution, regardless of the pricing relationship between price and net asset value. An important factor we consider in justifying imperfect substitution is the notion of excess price volatility that has received ample attention recently. This is because the component assets traded in the originating countries are fundamental to country funds traded in the core market, and excess volatility is measured by price volatility relative to fundamental volatility.

This is also borne out in Figure 2 and table 2.

The paper is organized as follows. Section II provides a foundation for the pricing of country funds on the basis of recent theoretical advances on the pricing of assets in segmented markets. The segmented market approach has been fruitfully utilized to study the effects of barriers on asset pricing and pricing of initial public offerings and securities with limited followership. Section III posits three alternative market structures for the trading of country funds and their underlying assets. The principal contribution of the paper is to draw important implications for the role of country funds in promoting pricing efficiency, local capital mobilization, local capital market development, etc. The derivative issues of the existence of fund premia and optimal size of floatation are also examined in this section. Some extensions of the analysis are pursued in Section III. Section IV concludes the paper.

II. Foundations for Country Fund Pricing

Our primary goal is to study the pricing impact of country funds from the standpoint of emerging economies. To do this, we begin with the pricing of the underlying component assets traded in the originating emerging countries. Actually the pricing implications in the context of advanced and readily accessible markets are direct and should emerge as a special case of our theoretical analysis. Indeed, in our framework it can be readily inferred that the prices of country funds should converge to the

net asset values of the component assets if both are traded in an integrated market, and no premia/discounts would be observed. Thus, the study of the country funds originating from the restricted securities markets is more challenging. Our approach is then to characterize the price of a representative portfolio of assets in a restricted environment as a starting point and draw implications for the introduction for three distinct scenarios of international market segmentation and arbitrage conditions.

A. Market Setting for Trading of Country Funds and Their Underlying Securities

The market setting follows the tradition of market segmentation as posited by Lintner (1971), Rubinstein (1973), Glenn (1976) in the domestic context, and by Black (1974), Stulz (1991), Errunza and Senbet (1981), Errunza and Losq (EL, 1985) in an international context. More recently the structure has been used fruitfully by Merton (1987) and Mauer and Senbet (MS, 1992) to study the effects of limited followership (imperfect information) and the underpricing anomaly of initial public offerings, respectively.² In particular, we find it convenient to follow the approaches of EL (1985) and MS (1992), although their respective motivations are different from our paper. This would then serve as a starting point in deriving relevant implications for country funds as we study them for alternative variations of market

² See also Errunza (1991) for a similar application. A variation of this structure is used by Alexander, et al (1987) to price a dually listed security in an otherwise fully segmented two-country setting, whereby investors have access only to their respective markets.

structure and arbitrage conditions.

Thus, the setting is in which there are N country funds traded in the advanced capital market, and the funds originate from N emerging economies. The advanced reference market is denoted as "core" which is costlessly accessed by all investors (T) in the universe. The emerging originating markets are accessible only to local investors, and hence they are completely segmented from each other. However, there is partial segmentation between the core and each of the emerging markets in the sense that investors from the originating countries have access to the core.

For an analytical convenience we deal with only one restricted asset for the most part of our initial analysis, accessible only to M ($M < T$) local investors in the restricted emerging market. This representation of the market structure is simple and it captures the focal issues in a reasonable way. In fact, as we shall see later it is rich enough to generate important implications regarding country funds. The implications for the country funds arise from the recognition that the model for an individual restricted asset is applicable to a collection or a portfolio of restricted assets which can be viewed as component assets to the fund.

B. Technology

We treat the risky securities of the core market (say the US) as an aggregate index with the end-of-period cash flow specified in terms of multiple factors as follows:

$$Y_C = \bar{Y}_C + \sum_K \beta_{CK} F_K + \varepsilon_C \quad (1)$$

where

Y_C = the core market's end-of-period cash flow

\bar{Y}_C = the expected value of Y_C

F_K = the kth economic factor

β_{CK} = the core market asset sensitivity to the kth economic factor

ε_C = the residual core market cash flow

We also invoke standard orthogonality conditions such that

$$E(F_K) = E(\varepsilon_C) = E(\varepsilon_C F_K) = E(F_K F_I) = 0$$

This is a two-date or single period framework in which the final date cash flows specified above include the liquidation proceeds. As a reference point we consider an asset in a restricted emerging market which is accessed only by M local investors, but its cash flow has a stochastic technological relationship with the assets in the core market. In general the relationship is such that the asset is not perfectly spanned by the

core assets; that is, it does not have a perfect substitute in the core market. We posit the spanning relationship following MS (1992), whereby the restricted asset's terminal cash flow can be stated as:

$$Y_F = \bar{Y}_F + \beta_F [Y_C - \bar{Y}_C] + \varepsilon_F \quad (2)$$

or alternatively

$$Y_F = \bar{Y}_F + \beta_F \sum_K \beta_{CK} F_K + \beta_F \varepsilon_C + \varepsilon_F \quad (3)$$

where

$\beta_F \beta_{CK}$ = the sensitivity of the restricted market asset to the kth economic factor

ε_F = the component of the restricted asset cash flow unspanned by the core market

$$E(\varepsilon_F) = E(\varepsilon_C \varepsilon_F) = E(\varepsilon_F F_K) = 0.$$

A similar spanning relationship follows for the remaining restricted assets from the other $N - 1$ emerging countries; we can again think of them in an aggregate for the purpose of cash flow specification. Thus, the aggregate cash flows for the remaining group of restricted assets can be specified as:

$$Y_W = \bar{Y}_W + \beta_W \sum_K \beta_{CK} F_K + \beta_W \varepsilon_C + \varepsilon_W \quad (4)$$

where

$\beta_W \beta_{CK}$ = the sensitivity of the aggregate cash flows for the assets of the rest of the restricted markets to the kth economic factor

ε_W = the component of the restricted asset cash flows unspanned by the core market

$$E(\varepsilon_W) = E(\varepsilon_C \varepsilon_W) = E(\varepsilon_F F_K) = 0.$$

For completeness, we also recognize a spanning relationship existing between the reference restricted security (F) and the aggregate (W) of the remaining restricted assets from N-1 emerging countries; recognizing this particular spanning relationship, we can restate the cash flows for the restricted asset:

$$Y_F = [\bar{Y}_F^C + \beta_F (\sum_K \beta_{CK} F_K + \varepsilon_C)] + [\bar{Y}_F^* + b_F \varepsilon_W + \varepsilon_F^*] \quad (5)$$

The cash flows are split into those spanned by the core market [first square parenthesis] and those "core unspanned" or specific to the asset [second square parenthesis]. The latter parenthesis recognizes there is a spanning relationship between the "core-

unspanned" and the remaining aggregate of restricted assets, with a factor of proportionality b_F and the unique residual ε_F^* . The specification in (5) will be useful later in our attempt to make predictions about the impact of introducing a new generation of country funds on the discounts/premia of the existing funds.

C. Portfolio and Market Equilibria

The technological specifications are adaptations of the frameworks utilized by MS (1992) in the context of underpricing anomaly of initial public offerings and by EL (1985) in the context of international asset pricing. While our motivation is specific to pricing of country funds, our basic environmental specification is similar to the earlier works motivated by different economic phenomena, particularly that of MS (1992) on the pricing of initial public offerings in the domestic market and of EL (1985) on international asset pricing under segmented markets. Consequently, the initial valuation that we wish to use as a starter follows from these works, and we will state it without proof. [See Appendix I for detailed proof along the lines of MS (1992)].

The approach is fairly standard in that individual investors are allowed to optimize their portfolio choices by picking fractional holdings in various categories of assets, depending upon accessibility of these assets. The efficient portfolio optimization is in a mean-variance paradigm, whereby individuals maximize their utility over current consumption, the expected value of portfolio wealth (or equivalently expected consumption) at a final date, and portfolio risk as reflected in the volatility of future consumption

at a final date. Portfolio demands are then aggregated and equated to aggregate existing supply of securities to derive a market equilibrium valuation. Note that the aggregation process takes explicit account of limited access, or alternatively as in Merton (1987) the Lagrange multipliers are used to measure a shadow price of imperfect access. However, the model delivers the same structure under either treatment of access restrictions. Thus, the value of a restricted asset can be specified as:

$$V_F = (1 + r_F)^{-1} [\bar{Y}_F - \theta^{-1} (\beta_F Z) - (\theta^M)^{-1} (b_F^2 \sigma^2(e_W) + \sigma^2(e_F^*))] \quad (6)$$

where

$$Z = (1 + \beta_F + \beta_W) [\Sigma \beta_{CK}^2 \sigma^2(F_K) + \sigma^2(e_C)]$$

The valuation in (6) recognizes that there is also risk-free lending and borrowing available to all participants at a rate equal to r_f^3 . The risk premium is of two forms:- a) complete price risk premium which is a function of Z , and b) the risk premium associated with limited risk sharing or nationalistic risk factor which is shared only by local investors. The complete pricing risk factor is subject to the universal price of risk, θ^1 , and the nationalistic risk factor is subject to $(\theta^M)^{-1}$.

³This assumption may turn out to be important, because we remark later that the differential interest rates (in real terms) across national boundaries may alone generate premia/discounts on the country funds. This is particularly so if the interest rate markets are segmented, along with the stock markets which are our focus in this paper.

The nationalistic risk factor is separately priced only due to limited risk sharing resulting from limited access. If access were complete, the model converges to the familiar capital asset pricing model, where the reference benchmark portfolio is the international portfolio. Also, if the restricted asset had a perfect substitute in the core market, it would be priced as an unrestricted asset with identical characteristics. The two important dimensions - access and substitution effects - can be dramatized if we make additional restrictions without much loss of generality. Following Merton (1987) and MS (1992), if we assume individuals everywhere have identical preferences and initial wealth, we can express the degree of access and substitution effects more explicitly as follows:

$$V_F = (1 + r_F)^{-1} \left([\bar{Y}_F - (\gamma/T) (\beta_F Z + b_F^2 \sigma^2(\epsilon_N) + \sigma^2(\epsilon_{F^*}))] \right. \\ \left. - (\gamma/T) [b_F^2 \sigma^2(\epsilon_N) + \sigma^2(\epsilon_{F^*})] \frac{(1-\alpha)}{\alpha} \right) \quad (7)$$

The interaction between the degree of access and substitution effects are reflected in the last term of the model. The degree of access is now measured by α = the number of investors accessing the security (M)/the number of all investors in the universe (T). The universal risk aversion measure or "price of risk" is given by γ/T , while the nationalistic price of risk is given by $\gamma/\alpha T$. The latter is greater than the former to the extent that $\alpha < 1$, reflecting the

extra risk premium demanded by local investors due to incomplete risk sharing. Note that if the "core-unspanned" risk (or the volatility of the unspanned cash flows in (5)) were zero, which is the case under the existence of perfect substitutes in the core, the last term would collapse to zero. In that case the effect of limited access is undone, because investors can achieve complete hedging by taking long and short positions in the core and restricted markets.

In the following section we shall link the pricing of the restricted assets in the emerging countries with the pricing of country funds in the core market. Under three alternative structures of market segmentation and arbitrage conditions, we derive various implications by using the model in (7) as a starting point. The principal contribution of this paper hinges upon developing appropriate theoretical implications to explain some important issues surrounding country funds - pricing efficiency, local capital mobilization, the existence of premia/discounts on country funds, and some policy implications for promoting funds, etc.

III. The Efficiency Role of Country Funds for Emerging Markets

The model in (7) can also be used to price a portfolio of restricted foreign assets. In the parlance of country funds, the price of such a portfolio is the net asset value of the fund. Hereinafter we reinterpret asset F as a portfolio of the component assets underlying the country fund. We can restate the net asset

value in an implicit functional form:

$$V_F = f[\bar{Y}, Z, \alpha, \sigma^2(\epsilon_F)] \quad (8)$$

where

\bar{Y}_F = Expected portfolio cash flow at the final date

Z = The complete pricing or spanning risk subject to the aggregate international price of risk ($\theta^{-1} = \gamma/T$)

α = The degree of access, wherein $\alpha=1$ denotes complete access

$\sigma^2(\epsilon_F)$ = The unspanned risk factor subject to the nationalistic price of risk [$(\theta^M)^{-1} = \gamma/\alpha T$]; Also the degree of substitution, wherein $\sigma^2(\epsilon_F) = 0$ denotes perfect substitution

T = Number of investors in the entire universe, including both the core and restricted local markets

Now we are ready to analyze the impact of introducing a country fund in the core (say the US) market. We look at three variations of market segmentation structure and arbitrage restrictions. Throughout we maintain a mildly segmented market structure in the sense that investors in the local, emerging economies are unrestricted, but investors from the advanced, core

markets are restricted from holding securities in the emerging economies directly. Thus, restrictions are imposed on capital inflows, but not on outflows, into the emerging economies. The three cases we consider are:

Model I: Restricted arbitrage by local investors and perfect substitution between the country fund and the portfolio of component securities

Model II: Unrestricted arbitrage by local investors and perfect substitution

Model III: Unrestricted arbitrage by local investors and imperfect substitution

Our goal under each scenario or model is to analyze the impact that country funds have in a) enhancing efficiency of pricing in the originating, emerging markets [pricing efficiency], b) enhancing the ability of local firms to mobilize capital at more favorable terms (or reduced costs of capital) [capital mobilization], c) enhancing development of local capital markets [market development]. The second round of implications relate to the existence of premium or discount on the country fund under each scenario and efficient strategies for the promotion of the country fund in the core. Table 1 outlines the three alternative market structures and the associated implications. The empirical analogs of these issues are pursued in a sequel paper.

Table 1

A. Model I

We begin with a simple case of market segmentation, where investors in the emerging markets face a ban or restriction on cross-border arbitrage between the country fund and its component assets, although the country fund is presumed to be a perfect substitute in terms of cash flow (technological uncertainty) for the cash flows of the portfolio of the component securities. Investors in the emerging countries are unable to undo the price differential between the country fund and its net asset value through arbitrage operations. The sense in which there is restriction on arbitrage may arise from the absence of short-sales or differential tax penalties (e.g., Germany; see the appendix on taxes), or that there is limited supply of funds due to control considerations.

Proposition 1

The introduction of a country fund has no impact on the pricing of the component assets in the local market, but the country fund sells at a premium relative to its net asset value.

Proof

Recognizing that a country fund is an unrestricted asset which was previously restricted, its risk is now subject to the universal price of risk (γ/T). In other words, it will be priced with complete access ($\alpha=1$) so that

$$V_P = (1 + r_f)^{-1} [\bar{Y}_P - \frac{\gamma}{T} (\beta_P Z + b_P^2 \sigma^2(e_W) + \sigma^2(e_P))] \quad (9)$$

where

V_p = the price of a country fund

In the absence of cross-border arbitrage, the restricted asset will have its entire risk, including the spanning risk, subject to the nationalistic price of risk; the country fund and the portfolio of restricted component assets will have differential value, with the net asset value expressed as:

$$V_F^* = (1 + r_f)^{-1} \left[\bar{Y}_F - \frac{\gamma}{\alpha T} (\beta_F Z + b_F^2 \sigma^2(e_N) + \sigma^2(e_F^*)) \right] \quad (10)$$

Comparing (9) with (10), the country fund price = $V_p > V_F$ = the net asset value, since $\gamma/T < \gamma/\alpha T$. The risk premium would be larger for the restricted security, as the cash flow uncertainty is identical for both the country fund and the component securities (by assumption of perfect substitution). Consequently, the country fund sells at a premium over the net asset value. Q.E.D.

Under this market structure the introduction of the country fund in the core market is of no consequence to the pricing of the component assets in the restricted emerging market from which the fund originates, although there may be diversification gain to the core (international) investors through their holdings of the fund. Indeed, the country fund and its component assets will be priced as though they are completely segmented, where the price of risk for the country fund conforms to the price of risk in the core (host)

market, whereas the price of risk for the underlying assets conforms to the market in the originating country. They plot on two different security market lines, so to speak. This is a subject of our empirical analysis, since this case establishes the possibility that prices of certain funds behave so as to "resemble" their hosts rather than their origins. Nonetheless, there is a premium on the country fund relative to its net asset value. It should be noted here that the existence of premia on country funds is un-informative about their efficiency gains to the emerging economies as this particular structure illustrates. The next two cases or models admit the possibility of such efficiency gains; indeed, under model II below there are important gains from the introduction of the country fund, yet the fund sells at zero premium.

B. Model II

This model, like Model I, allows the country fund to be a perfect substitute for the underlying assets traded in the originating market. Although, this is a case of two perfect substitutes trading in two different locations, investors in the core markets of the developed world are prevented from accessing the emerging markets from which the country funds originate. As we see below this capital inflow restriction is inconsequential, because the pricing differential will be eliminated by virtue of unimpeded arbitrage by local investors from the originating countries.

Proposition 2 (Pricing Efficiency and Capital Mobilization)

The introduction of a country fund enhances the value of the component assets in the originating country, and hence enhances local capital mobilization.

Proof:

The price of a country fund exceeds the (pre-fund introduction) net asset value in (7) or (8), because $\gamma/T < \gamma/\alpha T$.

Q.E.D.

Corollary 1

Ceteris paribus, greater outside access enhances the value of a restricted security at a decreasing rate. However, with complete access of the country fund in the core, the fund trades at zero premium.

Proof

Taking the first and second derivatives of (7) with respect to the degree of access (α),

$$V'_F(\alpha) = \left(\frac{Y}{T}\right) [b_F^2 \sigma^2(\epsilon_w) + \sigma^2(\epsilon_{F*})] (1/\alpha^2) (1+r_f)^{-1} \quad (11)$$

and

$$V''_F(\alpha) = -[2 \left(\frac{Y}{T}\right) [b_F^2 \sigma^2(\epsilon_w) + \sigma^2(\epsilon_{F*})] (1/\alpha^3) (1+r_f)^{-1} \quad (12)$$

Given, though, that the country fund is trading now in the core with complete access ($\alpha=1$), the net asset value of the

component, underlying assets will be bid up to $V_F' = V_P$, because of perfect substitution between the fund and the component assets and perfect cross-border arbitrage by local investors. Consequently, there will be no premium or discount on the fund.

Q.E.D.

Implications of Model II

1) Pricing Efficiency: There is pricing efficiency in the sense that the prices of the component securities in the originating countries (i.e., emerging economies) rise, on average, upon the introduction of the country fund. Thus, the country fund serves as a mechanism to complete the market.

2) Local Capital Mobilization and Capital Market Development: Firms in the originating (emerging) countries can now raise capital locally at more favorable terms (i.e., at increased prices or at reduced costs of capital). Thus, the introduction of country funds, apart from generating external capital directly, can enhance local capital mobilization. This in turn enhances local capital market development or expansion as more local firms are able to access the market, leading to increased efficiency and development of the local economies of the emerging countries.

3) Optimal Size of Floatation: Country funds can achieve the desirable goals of pricing efficiency for local capital markets and enhanced capital mobilization locally without direct foreign ownership or the destabilizing effects of "hot money" associated with international capital. Without countervailing costs, the

efficiency gains of the country fund can be obtained with its minimal size so long as it spans the component securities fully in the core market⁴.

Of course, the developing economies are concerned not only about pricing efficiency and local capital mobilization, but also about the volume of external funds raised. However, the current level of country funds constitute only a minuscule fraction of the total external sources of capital for developing economies {see footnote 1}, and it might be argued on this basis that country funds are economically insignificant. Our analysis suggests the contrary in the sense that they could have enormous impact on the efficiency of pricing local securities and local capital mobilization irrespective of their size.

The efficiency gains come about as local investors are able to reduce, and as the core investors increase, their holdings of domestic risks. This is achieved in two ways: first, investors in the core market can now hold local risk by buying into the country fund. Second, local investors can short sell the fund and acquire core assets with the proceeds. The important point is that unrestricted trade in local risk becomes possible with the establishment of a country fund of any size when domestic investors are able to short sell the fund in the core market. It is because

⁴The foreign ownership control could be achieved directly through restriction on equity ownership. However, the country fund traded in the core market (with complete access) accomplishes the same purpose while enhancing pricing efficiency and capital mobilization, whereas restricted equity portion is traded as part of the restricted foreign security.

of this property that the fund size is indeterminant. In this sense, country funds are like flagships in the core market, providing reliable information on the evolving price of a particular risk dimension.

4) **Discount/Premium:** Since the net asset value based on the component assets traded in the emerging economy is bid up to the same level as the price of the country fund traded in the core market, the premium/discount on the fund, $V_p - V_{p^*}$, is zero. Thus, the country fund need not originate from a capital market (say UK) that is fully integrated into the international market to sell at a zero price differential relative to its net asset value.

C. Model III

This scenario or model admits **imperfect substitution**, and it is perhaps the most realistic of the models considered. The two previous models allow the country fund to serve as a perfect substitute for its underlying component assets (in a portfolio sense). As Model II demonstrates, this notion of perfect substitution has important welfare implications for the originating emerging countries even when there are restrictions on the inflows of capital into those countries. However, under Model I these desirable properties of the introduction of the country fund are impeded by restrictions on cross-border arbitrage.

Imperfect substitution between the country fund and the underlying assets traded in the emerging countries may arise from

a number of factors, including but not limited to, a) sovereign risk exposure for holders of country funds, such as the possibility of exchange control, b) exchange risk arising from market conditions and the use of differential numeraire⁵, c) noise trading and excess volatility⁶. As mentioned earlier, there is evidence that time series behavior of fund prices (and the associated volatility) differs from that of the net asset values (see Figure 1 and table 2). The volatility is higher for fund prices and this

Table 2

divergence appears larger for less developed economies. This gives credence to this case under investigation, which is based on the notion of imperfect substitution.

Proposition 3

The introduction of a country fund in the core market enhances the value of the component assets traded in restricted, emerging markets, but it delivers either premium or discount on the country

⁵ Under a different numeraire for translating cash flows holders of the country fund and the component assets may face divergent or heterogeneous expectations, resulting in differential valuations for the two classes of investments and hence premia or discount on the fund. Note it is not true that exchange risk leads to a premium necessarily, because exchange rates could fluctuate favorably so as to serve as a hedge (say negative exchange risk "beta") to actually generate a discount.

⁶ The notion of excess volatility fits in well with such studies as Summers (1986) and Shiller (1981) who claim that observed price volatility is excessively high relative to its fundamental counterpart. Under our framework the component securities are fundamental to the country fund securities.

fund.

Proof

Consider a new spanning (albeit imperfect substitution) relationship between the component assets and the country fund now in the core market

$$\varepsilon_F = b_F \varepsilon_P + \varepsilon_F^{**} \quad (13)$$

where

ε_P = the component of the country fund cash flow unspanned by the core market

ε_F^{**} = the component of the underlying asset cash flow unspanned by the country fund

Rewriting (9) to recognize the possibility of divergence in the volatilities of the country fund and the underlying assets

$$V_P = (1 + r_f)^{-1} \left[\bar{Y}_F - \frac{\gamma}{T} (\beta_F Z + \sigma^2(\varepsilon_P)) \right] \quad (14)$$

where it is assumed that complete pricing risk factor (Z) is unchanged, but there is divergence in the unspanned risks (i.e. there is differential in the component risks of the fund and its underlying assets unspanned by the core market). The degree of substitution between the unspanned risks can be characterized as $\lambda = b_F^2 \sigma^2(\varepsilon_P) / \sigma^2(\varepsilon_F)$.

It also follows that the net asset value of the component securities is:

$$V_F^* = (1 + r_f)^{-1} \left[\bar{Y}_F - \frac{\gamma}{T} (\beta_F Z + b_F^2 \sigma^2(\varepsilon_P)) - \frac{\gamma}{\alpha T} \sigma^2(\varepsilon_{F^{**}}) \right] \quad (15)$$

Comparing (15) with (7) or (8), we see that $V_F^* > V_F$, because only a component of the previously unspanned risk, $\sigma^2(\varepsilon_{F^{**}})$, is subject to the nationalistic price of risk upon the introduction of the country fund in the core market. Consequently, the net asset value increases in spite of imperfect substitution or imperfect spanning relationship between the country fund and its underlying assets traded in the emerging market. Comparing (15) with (14), though, $V_F - V_F^*$ can be positive or negative, or it is possible for the country fund to sell at either a discount or premium.

Q.E.D

Implications of Model III

1) **Pricing Efficiency:** There is increased pricing efficiency in the sense that the local security prices get bid up to reflect the fact that a larger component of the asset risks are subject to the universal price of risk. This efficiency effect is similar to the implication in (1) of Model II. We can be more precise about the determinants of the efficiency ("welfare") gain by stating it more explicitly as

$$Q = \gamma/T(1/\alpha - 1)\lambda\sigma^2(\varepsilon^F) = f(\text{Risk Unspannable by the Core, Differential Between Local Price of Risk and Universal Price of Risk, the Degree of Substitution between the Fund and the Underlying Assets}).$$

Other things being equal, emerging countries with larger unspannable risk benefit more from the introduction of the country fund in the core (advanced) market. Such countries typically have idiosyncratic investment opportunities or unique natural resources. At the limit, of course, the effect is nil if either (a) $\lambda = 0$, or (b) $\alpha = 1$. Also, other things being equal, the gain is larger if the local price of risk is higher relative to the world or universal price of risk, which may be the case for small emerging markets with limited risk-sharing opportunities. This effect is reflected in α . Finally, a greater substitutability of the country fund and its underlying assets increases the efficiency gain. This effect increases with λ .

2) **Capital Mobilization and Capital Market Development:** Similar to Model II, local firms can raise capital more advantageously at reduced costs of capital. Thus, increased local capital mobilization and local market development are possible due to the introduction of the fund in the core market.

3) Due to imperfect substitution, though, the pricing efficiency and capital mobilization effects of the country fund are smaller than their analogs in Model II. It is, therefore, advisable to introduce policies that reduce imperfect substitutability of the country fund and its component assets traded in the originating country (see below).

4) The entire discussion relating to the optimal size of the country fund floatation under Model II applies here. (See implication # 3 of Model II above).

5) **Premium/Discount:** The country fund sells either at a premium or discount. That is, $V_P - V_F^*$ is positive or negative. To see this, it should be recognized that, with the introduction of the country fund, both access and substitution effects bear on pricing. The degree of access is assumed complete for the country fund ($\alpha=1$), and hence resulting in a positive pricing effect. However, the imperfect substitution may be such that $\sigma^2(\epsilon_P) < \text{or} > \sigma^2(\epsilon_F)$. If the country fund prices become more volatile, then there is a negative pricing effect. In the event that the negative substitution effect more than offsets the positive access effect, the fund sells at discount.

6) **Is Fund Discount/Premium an Appropriate Predictor of Efficiency Gains to the Originating Countries?** Model III makes it evident that the positive pricing efficiency and capital mobilization effects are achieved irrespective of the fund's premium or discount. With imperfect substitution, one cannot infer the advantages of the introduction of a country fund by merely observing whether it is selling at a discount or premium. Actually as shown in Model I, fund premium can occur even when its role is inconsequential to local asset pricing and capital mobilization.

7) **The Country Fund Factor:** Under imperfect substitution stemming from additional factors affecting country fund prices, there is now an additional pricing factor common to certain segments of the country funds. In the language of the arbitrage pricing theory (APT), this factor conforms neither to the originating countries nor to the reference countries. The

additional factor is analogous to the risk factors in (3), exclusive of the complete pricing risk, $\beta_p Z$. This prediction is a basis for our empirical analysis based on the country fund index.

IV. Extensions

The preceding analysis has focused primarily on the risk dimension and incomplete risk sharing in an international environment characterized with investor restrictions. However, there are significant cases where country funds trade at a discount even when they do not originate from countries with limited capital and inflow restrictions. As a starter, this observation is consistent with long-standing anomaly that closed-end funds trade typically at a discount even when they trade in the domestic market (e.g., closed-end funds traded in the United States). In this section, we wish to catalogue additional factors that have a bearing on the pricing of country funds relative to their net asset values. These additional factors of interest will be used in a sequel empirical paper in explaining cross-sectional variations in country fund returns and premia or discounts.

A. Interest Rate Differential. The preceding analysis assumed that investors faced the same real rate of interest across national boundaries. This may not hold between pairs of countries with differential creditworthiness such that the induced interest rate differential between the core market and the originating emerging country may deliver discount or premium on the country fund originating from the latter country. Suppose that the core country

is the US and the emerging country is Brazil with lower creditworthiness and higher real rate of interest. This may alone deliver a premium on the Brazilian fund, since the underlying securities traded in Brazil are presumably discounted by Brazilians at a higher rate than the rate applicable to the country fund by US investors.

The preceding argument is incomplete, though, because Brazilian investors may fully access the US risk-free government securities and hence face the same benchmark rate of interest as investors in the US for lending purposes. In addition, they may use the US asset investments as a collateral for borrowing purposes in the event that credit enforcement is an issue. Thus, in the absence of investor restrictions leading to segmentation in the international money markets, the interest rate differential alone may not deliver a price differential on the country fund relative to its net asset value. Moreover, the interest rate differential may reflect country risk differential, affecting the core market discount rate applicable to the country fund. While the interest rate differential between Brazil and the US may alone lead to a premium, the country risk factor leads to a discount that reflects the risk of expropriation of the foreign portfolio investors. When the probability of expropriation is low, which is likely when country funds are small, a premium may emerge. At any rate, it is difficult to determine the net effect of the interest rate differential on the price of the fund relative to its net asset value.

B. Tax and Regulatory Factors. Our analysis thus far has not explicitly considered the impact of the tax treatment of country funds, although implicit in Model III above is the possibility of differential tax treatment rendering imperfect substitution between the country fund and the component securities traded in the originating countries. A stylized description of the US tax treatment of country funds is provided in Appendix II. The impact of tax treatment can be appreciated just on the basis of the most straightforward case defined as follows:

1. The fund qualifies as a Regulated Investment Co. (IRC) and hence subject to no corporate taxation.

2) All distributions of net investment income (dividends, interest, net short-term capital gains, etc.,) are taxable at an ordinary personal tax rate. [Note: Taxes are imposed even when income is reinvested].

3) Foreign withholding taxes and foreign income taxes paid by the fund are treated as paid by shareholders who then claim these as credits/deductions for US tax purposes (US is the host country here).

Under the above scenario the controlling tax rate on the fund income is the US income tax rate. If the controlling tax rate is identical to the foreign (originating country) tax rate, there will be no tax-induced differential between the fund price and its net asset value. Note that the net asset value is impacted only by the foreign taxes imposed on component assets in the originating country. Thus, the premium/discount = $f(\text{US/foreign income tax rate})$

differential)⁷.

C. Optimality of Country Fund Size. As discussed in the last section, the efficiency gains of local asset pricing and local capital mobilization can be achieved with a minimal size of country fund flotation. (See implication # 3 of Models II and III). In other words, without some countervailing forces against the efficiency gains of a country fund, its optimal size is indeterminate.

One countervailing force is the possibility of passing up valuable investment opportunities due to local capital shortage. This calls for raising funds externally, thus resorting to the use of country funds for that purpose. Thus, optimal size = f(Efficiency gains, economic colonization (foreign control), external capital mobilization). Since efficiency gains from pricing and capital mobilization can be achieved at any size, the optimal country fund size is determined by equating the marginal benefit of external capital mobilization and the marginal cost associated with diminished ownership control.

V. Conclusions and Policy Implications

Our analysis shows that country funds traded in the developed

⁷In some cases the tax treatment is complex (e.g., Germany), affecting the extent to which investors engage in arbitrage. Thus, Model I discussed earlier may follow from tax-related impediments to the arbitrage process. Rather than treating regulatory and tax factors as separate predictors of pricing, one could view them as engendering imperfect substitution. That way the model can accommodate them in its current structural form. For instance, sovereign risk may impact the substitution effect negatively.

capital markets can be beneficial in promoting the efficiency of pricing in the emerging capital markets and in enhancing capital mobilization by local firms of the originating countries. These gains vary depending upon the degree of international investor access to the emerging markets (access effect), the degree to which the core or advanced market securities span the securities in the emerging markets (substitution effect), and cross-border arbitrage restrictions.

The issue of the country fund selling at a discount or premium, relative to its underlying asset value, is only derivative in our framework. Even when the country fund sells at a discount, there can be efficiency gains to emerging economies. One particular model structure that we consider, which may deliver a discount, is based on imperfect substitution between the country fund returns (as generated in the advanced core market) and the underlying asset returns (as generated in the originating, emerging market) stemming from the notion of excess price volatility (or noise trading) relative to fundamental volatility. We emphasize that the component assets traded in the originating countries are fundamental to country funds traded in the core advanced market.

Thus, we can outline the main conclusions and policy implications that can be drawn in general as follows.

1. Pricing Efficiency and Resource Mobilization

In general, the introduction of the country fund in the advanced or developed market increases the prices of the underlying component assets traded in the originating emerging markets. Thus,

the country fund promotes pricing efficiency in the emerging local markets, since the country fund, in a sense, serves as a mechanism to complete the international markets. As a corollary to the pricing efficiency gain, the introduction of the country fund promotes local capital or resource mobilization in the sense of making it possible for local firms in the emerging (originating) countries to raise capital at more favorable terms or at reduced discount rates in the local capital markets. This in turn enhances local capital market development or expansion as more local firms are able to access the equity market. Increased pricing efficiency should lead to increased economic development of the emerging economies.

Given that the local capital markets have restricted access, the specific determinants of the pricing efficiency gains to emerging capital markets and resource mobilization by local firms are (a) the risks of the local assets constituting the fund unspanned by the core financial market in the developed world in which the fund is traded, (b) the differential between local price of risk and universal price of risk, and (c) the degree of substitution between the fund and the underlying assets traded in the originating (emerging) markets. Other things being equal, emerging countries with larger unspannable risk benefit more from the introduction of the country fund in the core (advanced) market. Such countries typically have idiosyncratic investment opportunities or unique natural resources. Moreover, the gain is larger if the local price of risk is higher relative to the world

or universal price of risk, which may be the case for thinly capitalized emerging markets with limited risk-sharing opportunities. Finally, a greater substitutability of the country fund and its underlying assets increases the efficiency gain. Conversely, the gain is smaller if country fund prices are excessively volatile relative to fundamental volatility of the component assets traded in the emerging markets.

2. Efficient Promotion of Country Funds and a Case for Price Stabilization

As a policy matter, country funds, that should be encouraged by emerging countries for introduction by fund promoters, should be targeted to those local assets with imperfect or no substitutes in the advanced core markets. Of course, the objective of efficiency gains for the emerging economies may be not be consistent with the objectives of the fund promoters. In a sequel paper we will have an empirical evidence suggesting that the actual choice of the underlying securities is too conservative with excessive usage of "blue chips". We reach this conclusion by comparing the residual volatilities of the component assets in the country funds and those of the assets in the local market.

Imperfect substitution between the country fund and the component assets traded in the local markets mitigates the efficiency gains. We have evidence that the country fund prices are excessively volatile relative to their net asset values, suggesting imperfect substitution. Given that the component assets are fundamental to the country fund, the excess volatility fits in

with an accumulation of the literature on excess volatility and noise trading. Consequently, excess volatility detracts from the benefits of the country fund in undoing the effects of limited access to the emerging markets. As a policy implication, a case can be made here for stabilizing country fund prices through such mechanisms as share repurchases, new issues, etc.

The current level of country funds constitutes only a small fraction of the total external sources of capital for developing economies, but this is no basis to render them economically insignificant. Despite their small size, country funds can have enormous impact on the efficiency of pricing local securities, which are otherwise restricted for foreign holdings, and enhance capital mobilization by firms in the local markets. Achieving such efficiency gains with limited size can address the prevailing concerns of emerging countries regarding foreign control of local capital and the destabilizing effect of "hot money" from abroad.

3. Fund Premium or Discount and a Case for Initial Discount Subsidization

The country fund may sell at a zero premium relative to its net asset value even if it originates from an emerging economy that bans or restricts foreign holding of the underlying securities directly through the local markets. One such case discussed in this paper is when the country fund is a perfect substitute for the component assets traded in the local (emerging) markets and is completely accessed by investors from both markets, for the prices of component assets in the local markets are bid up to the same

level as the country fund prices by the cross-border arbitrage of investors from emerging markets. However, a positive or negative (discount) premium associated with incomplete risk-sharing may arise from limited access (access effect) and/or imperfect substitution (substitution effect). For instance, the effect of excess volatility of the country fund (negative substitution effect) may more than offset the positive price effect of the country fund being accessed more widely in a global market, and hence delivering discount on the fund. By the same token, the time variation of fund discounts/premia (see figure 3) may be due to time variation in factors affecting access and substitution effects. For instance, the factors affecting excess volatility (e.g., investor sentiment, noise trading) might change over time, affecting the substitution effect.

There is a policy issue when new issues of country funds are expected to trade at a discount. It would become unprofitable for underwriters to issue the funds through public offerings, since the initial investors would stand to lose relative to waiting and buying when the funds are seasoned. When efficiency gains exist from the issuance of the funds, even when they trade at a discount, the issue arises as to whether some institutions, particularly domestic public authorities or development agencies, take the initial loss so as to promote the fund into existence.

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Table 1

Alternative Market Structures

Model	Access by local Investors to Core	Degree of Substitution of CF for local assets	Pricing Efficiency	Capital Mobiliz- ation	Premium (+) or Discount (-)
Model I	Restricted	Perfect	0	0/+	+
Model II	Unrestricted	Perfect	+	+	none
Model III	Unrestricted	Imperfect	+	+	+/-

APPENDIX I

PORTFOLIO EQUILIBRIUM

While our motivation is country fund pricing in the international context, the derivation of the portfolio equilibrium is a straightforward application of the Mauer-Senbet (1992) framework for the pricing of initial public issues in the domestic market. The MS approach itself is a variation of earlier frameworks by Errunza and Senbet (1981), EL (1985), and Merton (1987). Although all of these models possess similar structure, they are set apart by their respective motivations and the implications that are drawn for the particular economic phenomena under study. The implications regarding country funds are studied for alternative variations of market structures in the text of the paper.

The investor's choice problem is to maximize his Von Neumann-Morgenstern utility, $U(\cdot)$, of current and expected future consumption by picking fractional holdings in the core market assets (α_c^i), in the restricted assets from emerging markets (α_r^i), in the aggregate restricted market assets (α_w^i), and riskless borrowing or lending in the amount B^i at one-plus the riskless rate of interest, R .⁸ If the investor lacks access to the restricted securities, $\alpha_r^i = \alpha_w^i = 0$. We shall explicitly include investor access restrictions at the demand aggregation

⁸The risk-free asset is assumed internal with zero net supply.

stage.⁹ In a mean-variance world, the investor faces the following objective function.

$$\begin{aligned} & \text{Maximize} && U^i(C_0^i, \bar{C}_1^i, \sigma^2(C_1^i)) \\ & && \alpha_C^i, \alpha_F^i, \alpha_W^i, B^i \end{aligned} \quad (A1)$$

subject to

$$C_0^i = W_0^i = [B^i + \alpha_C^i V_C + \alpha_F^i (V_F^C + V_F^F) + \alpha_W^i (V_W^C + V_W^F)] \quad (A2)$$

$$\begin{aligned} \bar{C}_1^i &= RB^i + \alpha_C^i \bar{Y}_C + \alpha_F^i (\bar{Y}_F^C + \bar{Y}_F^F) \\ &+ \alpha_W^i (\bar{Y}_W^C + \bar{Y}_W^F) \end{aligned} \quad (A3)$$

$$\begin{aligned} \sigma^2(C_1^i) &= (\alpha_C^i)^2 \sigma^2(Y_C) + (\alpha_F^i)^2 [\sigma^2(Y_F^C) + \sigma^2(Y_F^F)] \\ &+ (\alpha_W^i)^2 [\sigma^2(Y_W^C) + \sigma^2(Y_W^F)] + 2\alpha_C^i \alpha_F^i \text{COV}(Y_C, Y_F^C) \\ &+ 2\alpha_C^i \alpha_W^i \text{COV}(Y_C, Y_W^C) + 2\alpha_F^i \alpha_W^i \text{COV}(Y_F^C, Y_W^C) \end{aligned} \quad (A4)$$

where

W_0^i = the initial wealth of investor i ,

C_0^i = the current consumption of investor i ,

\bar{C}_1^i = the expected future consumption of investor i ,

$\sigma^2(C_1^i)$ = the variance of future consumption.

V_C = the current value of all securities in the core market

⁹Like Mauer and Senbet, we do not distinguish between those investors with access and those without access to emerging market securities when deriving first-order necessary conditions. Access restrictions are taken into account in the demand aggregation process. This differs, for example, from Merton (1987) wherein Lagrange multipliers are utilized to measure the shadow price of imperfect accessibility.

$V_F = V_F^C + V_F^P$ = the current value of assets in the emerging market; decomposable into the core market spanned component, V_F^C , and the unspanned value, V_F^P ;

$V_w = V_w^C + V_w^w$ = the current value of restricted assets in the aggregate of the rest of emerging markets; decomposable into spanned, V_w^C , and unspanned, V_w^w , components.

The constraints in (A2) - (A4) can be substituted into (A1), yielding the unconstrained objective function to be maximized with respect to the decision variables. The resulting first-order conditions are:

$$\frac{\partial U^1}{\partial B^1} = -U_0^1 + \bar{U}_1^1 R = 0, \quad (A5)$$

$$\begin{aligned} \frac{\partial U^1}{\partial \alpha_c^1} = & U_0^1 (-V_C) + \bar{U}_1^1 \bar{Y}_C + 2\bar{U}_\sigma^1 [\alpha_c^1 \sigma^2(Y_C) \\ & + \alpha_F^1 \text{COV}(Y_C, Y_F^C) + \alpha_w^1 \text{COV}(Y_C, Y_w^C)] = 0, \end{aligned} \quad (A6)$$

$$\begin{aligned} \frac{\partial U^1}{\partial \alpha_F^1} = & U_0^1 (-V_F) + \bar{U}_1^1 \bar{Y}_F + 2\bar{U}_\sigma^1 [\alpha_F^1 \sigma^2(Y_F) \\ & + \alpha_C^1 \text{COV}(Y_C, Y_F^C) + \alpha_w^1 \text{COV}(Y_F, Y_w)] = 0, \end{aligned} \quad (A7)$$

$$\begin{aligned} \frac{\partial U^1}{\partial \alpha_w^1} = & U_0^1 (-V_w) + \bar{U}_1^1 \bar{Y}_w + 2\bar{U}_\sigma^1 [\alpha_w^1 \sigma^2(Y_w) \\ & + \alpha_C^1 \text{COV}(Y_C, Y_w^C) + \alpha_F^1 \text{COV}(Y_F, Y_w)] = 0, \end{aligned} \quad (A8)$$

where

$$U_0^i = \frac{\partial U^i}{\partial C_0^i} > 0; \quad \bar{U}_1^i = \frac{\partial U^i}{\partial \bar{C}_1^i} > 0; \quad \bar{U}_\sigma^i = \frac{\partial U^i}{\partial \sigma^2(C_1^i)} < 0.$$

The foregoing inequalities follow the standard conditions of non-satiation and risk aversion.

We now explicitly recognize emerging market accessibility restrictions to derive asset demands. Let M and H denote the number of investors with exclusive access to the emerging market and the rest of the aggregate emerging markets, respectively. The two sets of investors, M and H, are disjoint. The remaining L investors are completely excluded from the primary markets, and invest only in the core market securities. We obtain the following implicit asset demand functions by rearranging the first order conditions:

risk-free asset;

$$U_0^i / \bar{U}_1^i = R \quad i=1, \dots, L+M+H$$

core market asset;

$$COV(Y_C, \alpha_C^i Y_C + \alpha_F^i Y_F^C + \alpha_W^i Y_W^C) = \theta^i [\bar{Y}_C - RV_C] \quad i=1, \dots, L+M+H, \quad (A9)$$

restricted emerging market asset;

$$COV(Y_F, \alpha_F^i Y_F + \alpha_C^i Y_C) = \theta^i [\bar{Y}_F - RV_F] \quad i=1, \dots, M, \quad (A10)$$

the aggregate of the rest of emerging markets;

$$COV(Y_w, \alpha_w^i Y_x + \alpha_c^i Y_c) = \theta^i [\bar{Y}_w - RV_w] \quad i=1, \dots, H, \quad (A11)$$

where

$\theta^i = - \bar{U}_i^i / (2\bar{U}_c^i) =$ the marginal rate of substitution between expected future consumption and volatility (risk), or the inverse of the Pratt-Arrow absolute risk aversion coefficient.

Note that (A9) - (A11) explicitly recognize that emerging market investors can access the core market and only their own securities markets. As a consequence, in (A10) $\alpha_w^i = 0$ for $i=1, \dots, M$, and in (A11) $\alpha_c^i = 0$ for $i=1, \dots, H$.

In equilibrium, universal aggregate demand for all assets must equal universal aggregate supply. Consider first the demand for core market assets. Equation (A9), which is the demand function for the core market asset, must hold for all $L+M+H$ investors. Hence, summing (A9) over all investors yields:

$$\sum_{i=1}^{L+M+H} COV(Y_c, \alpha_c^i Y_c + \alpha_F^i Y_F^C + \alpha_W^i Y_W^C) = [\bar{Y}_c - RV_c] \sum_{i=1}^{L+M+H} \theta^i.$$

Market Clearing conditions require that

$$\sum_{i=1}^{L+M+H} \alpha_C^i = \sum_{i=1}^M \alpha_F^i = \sum_{i=1}^H \alpha_W^i = 1.$$

Therefore, letting

$$\sum_{i=1}^{L+M+H} \theta^i = \theta$$

we have

$$COV(Y_C, Y_C + Y_F^C + Y_W^C) = [\bar{Y}_C - RV_C] \theta. \quad (A12)$$

Or equivalently, upon rearrangement

$$V_C = R^{-1} [\bar{Y}_C - \theta^{-1} COV(Y_C, Y_A^C)], \quad (A13)$$

where

$$Y_A^C = Y_C + (Y_F^C + Y_W^C). \quad (A14)$$

Equation (A13) is the certainty equivalent valuation of Y_C , where, Y_A^C is the aggregate of the core market cash flow and spannable emerging market cash flow components, and θ^{-1} is the aggregate "price" of risk.

Similarly, aggregation of the demand function (A10) and market clearing conditions, along with the factor structure for cash flows in (1) - (5) in the text, delivers the valuation for the restricted emerging market asset in (6) [see text].

where

$$\theta^M = \sum_{i=1}^M \theta_i,$$

APPENDIX II

U.S. Tax Treatment of the Investment Entity (Fund)

The fund may be able to obtain preferred tax treatment relative to other corporate forms¹⁰ by qualifying as a Regulated Investment Company (RIC). To qualify the following three conditions must be met:

- 1) Derive 90% of gross income from investment activities;
- 2) Derive less than 30% of gross income from short term investments of less than three months;
- 3) Meet certain diversification criteria.

Foreign Tax Credit: The fund can file an election with the IRS to pass-through to the fund's shareholders the amount of foreign taxes paid by the fund if more than 50% of the funds total assets are foreign. Subject to certain technicalities (see below) the foreign taxes paid can be used by shareholders as a credit or deduction of foreign taxes.

U.S. Tax Rates:

- 1) **Income Tax and all Distributions: 0%**

This is provided that the fund distributes at least 90% of net investment income (dividends and distributions received less

¹⁰Since no corporate income tax is paid on distributions to shareholders.

operating expenses) and 90% of its net short-term capital gains (excess of net short-term capital gains over long-term capital losses, if any). If these requirements are not met, a non-deductible excise tax of 4% is incurred.

2) Undistributed Net Long-term Capital Gains: 34%

Net long-term capital gains are net long-term capital gains less net short-term capital losses. If these are distributed, no tax is paid. If undistributed, a tax rate of 34% is imposed.

3) Carrybacks and Carryovers:

No carrybacks are permitted for an RIC but capital losses can be carried over for 8 years.

U.S. Tax Treatment of Individual Investors

This is just an outline of tax treatment of U.S. residents or citizens. Note also that foreigners with trade/business connections are treated as residents for tax purposes.

- 1) Distributions of Net Investment Income and Net Short-term Capital Gains are taxed at ordinary tax rates.
- 2) Distributions of Net Long-term Gains are taxed at ordinary tax rates. This includes a return of capital.
- 3) Undistributed Net Long-term Gains: These are included in a shareholder's income as long-term capital gains, and the tax paid by the company (34%) is credited to the shareholders U.S. income tax payable. Therefore, the effect seems to

have no effect on individual taxes paid. The tax basis¹¹ of the shareholder's shares in the fund is increased by the net amount which is 66% of the undistributed capital gain.

- 4) Foreign Tax Credit: The fund needs to qualify every year¹² to pass through foreign taxes to its shareholders.

Foreign income is composed of distributions from foreign entities. Foreign capital gains and foreign exchange gains or losses are part of U.S. operations.

U.S. individuals typically receive credit for foreign taxes paid. Hence, the objective is to treat shareholders of the fund the same as individuals who receive foreign income.

Shareholders have two options; a) to deduct their share of foreign income taxes paid by the fund, or b) use them as a tax credit, but not a mixture. Deductions are available only to those shareholders who itemize deductions and have to exceed 2% of the individual's adjusted gross income. Deductions reduce the taxable income, and hence do not provide a one-for-one saving, unlike credit. On the other hand, the foreign tax credit cannot be used to diminish the tax liability from U.S. sources.

¹¹This is the value of the investment that the IRS uses to calculate the capital gain when the shares are sold.

¹²The requirements are that the fund distributes 90% of its income and that 50% of its assets are foreign.

FIGURE 1

LAUNCHING OF COUNTRY FUNDS

New Offerings in US - Billions of US\$

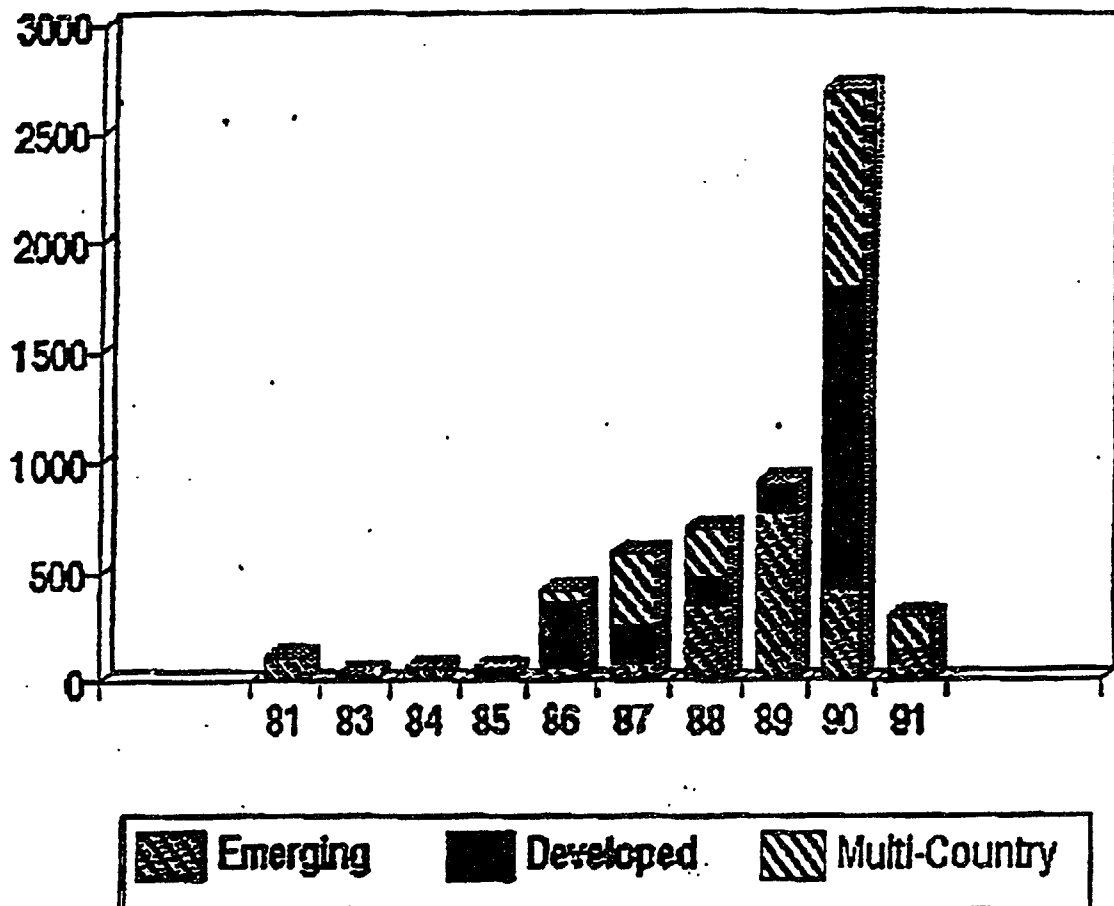


Figure 2

US-TRADED COUNTRY FUNDS INDEX

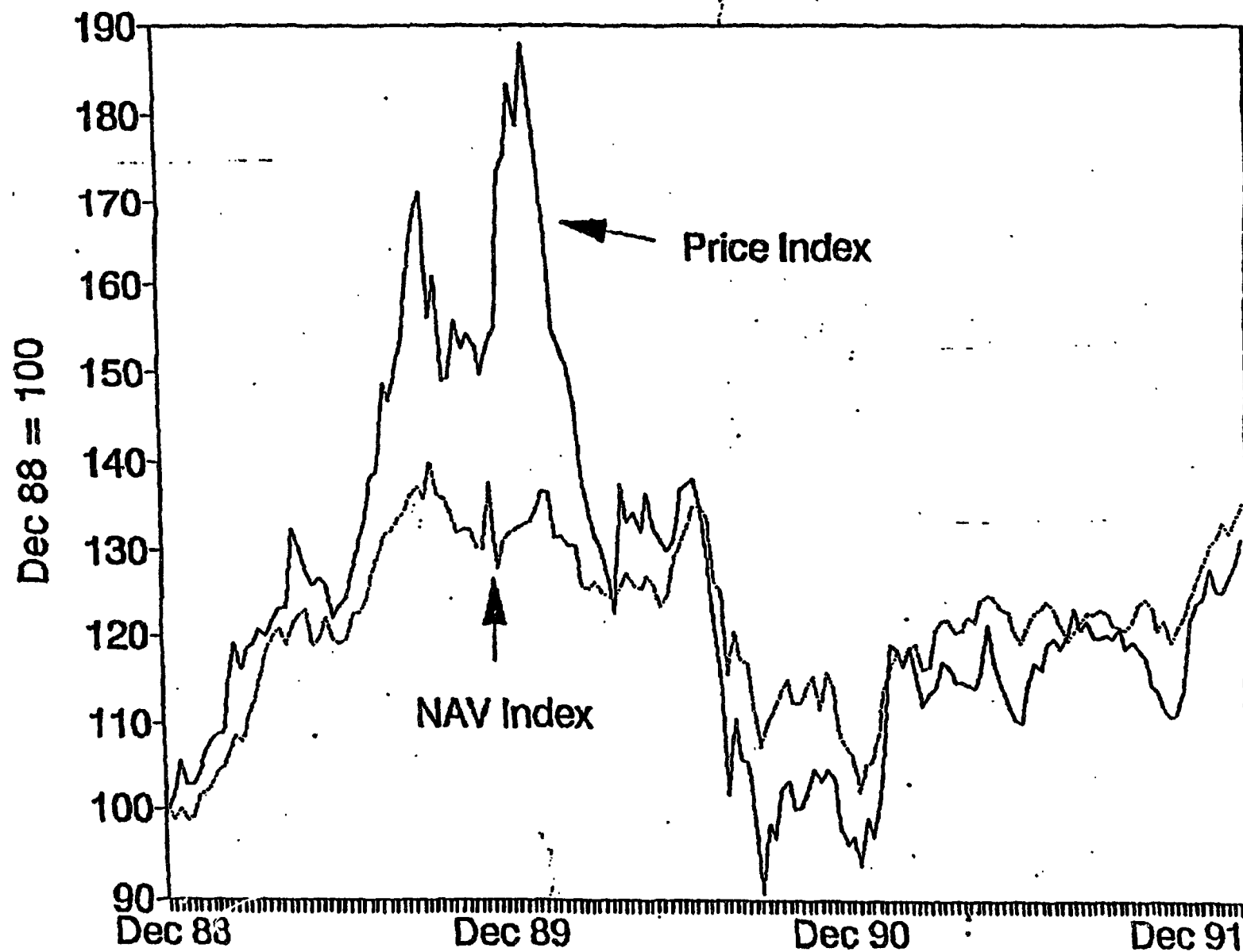


Figure 3

US-TRADED COUNTRY FUNDS

Value-Weighted Average Premium/Discount

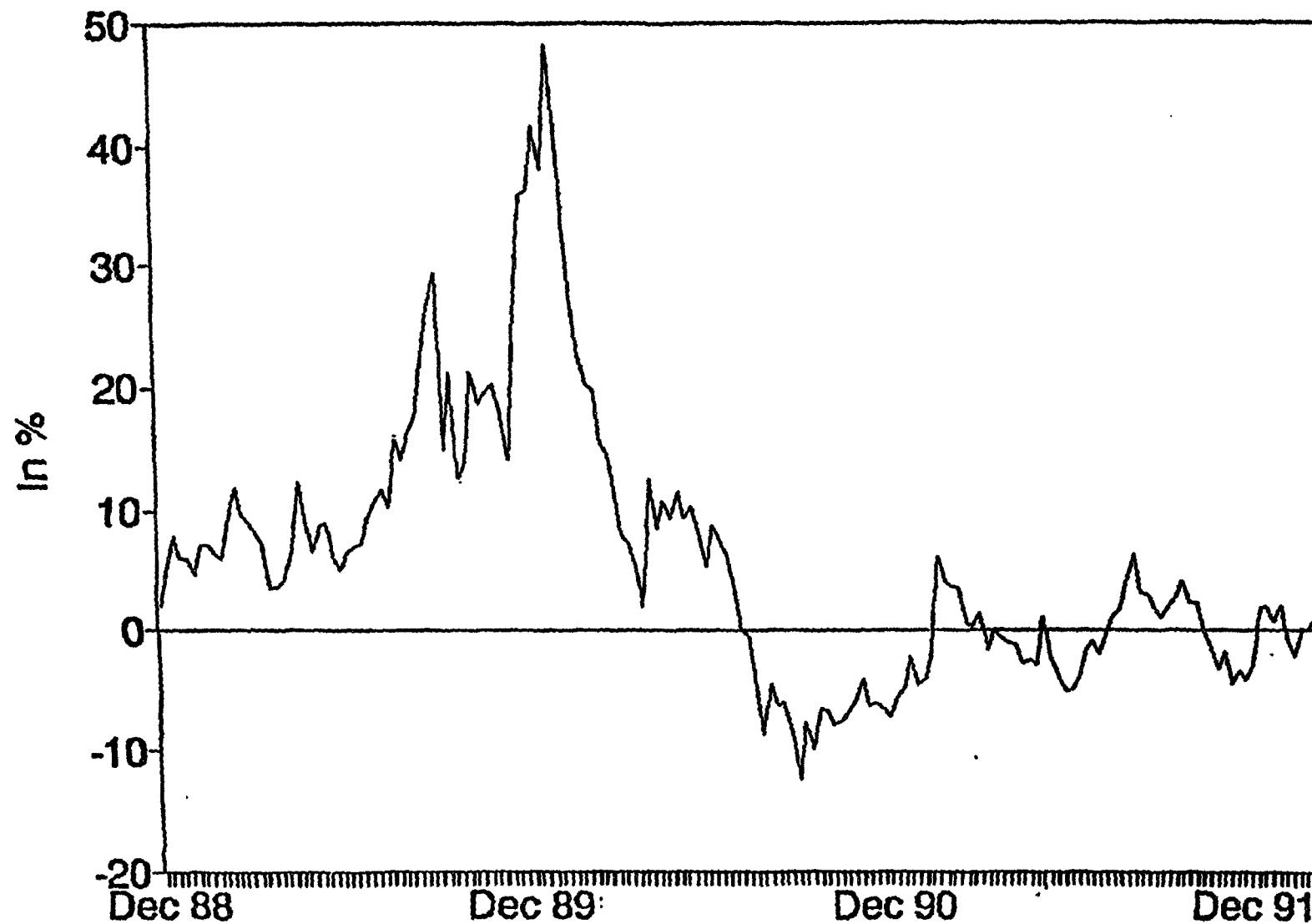


TABLE 2

COUNTRY FUNDS: COMPARATIVE VOLATILITIES (1)
FUNDS SORTED BY DESCENDING RATIO (1)/(2)
PERIOD: SINCE FUND INCEPTION UNTIL 06/28/91

OBS	FUND	STD DEVIATION PRICE RETURNS (1)	STD DEVIATION NAV RETURNS (2)	STD DEVIATION MKT RETURNS (3)	RATIO (1)/(2)	RATIO (1)/(3)	RATIO (2)/(3)
1	SINGAPORE FUND	0.0459842	0.0106574	0.039639	4.31477	1.16009	0.26886
2	FIRST PHILIPPINE FUND	0.0608341	0.0149597	0.066033	4.06654	0.82127	0.22655
3	MEXICO EQUITY/INCOME FUND	0.0476027	0.0140794	0.039463	3.38101	1.20826	0.35678
4	JAKARTA GROWTH FUND	0.0622949	0.0185163	0.038196	3.38433	1.63094	0.48477
5	FRANCE GROWTH FUND	0.0647729	0.0218454	0.030433	2.99245	2.12835	0.71124
6	PORTUGAL FUND	0.0590491	0.0220324	0.029354	2.80905	2.01162	0.77102
7	SPAIN FUND	0.0738364	0.0286853	0.027813	2.57401	2.65472	1.03136
8	INDONESIA FUND	0.0628551	0.0248707	0.040010	2.52727	1.57098	0.62161
9	MALAYSIA FUND	0.0791697	0.0321039	0.038496	2.46605	2.05659	0.83396
10	CHILE FUND	0.0638540	0.0272545	0.034339	2.34288	1.85953	0.78370
11	ITALY FUND	0.0610389	0.0280369	0.034386	2.17709	1.77613	0.81583
12	EMERGING MEXICO FUND	0.0548820	0.0267346	0.030923	2.05284	1.77480	0.86456
13	KOREA FUND	0.0615942	0.0301289	0.031360	2.04436	1.96409	0.96074
14	NEW GERMANY FUND	0.0621019	0.0308592	0.036176	2.01242	1.71666	0.85303
15	AUSTRIA FUND	0.0881553	0.0455913	0.056396	1.93380	1.56316	0.80842
16	EMERGING GERMANY FUND	0.0595308	0.0312380	0.036536	1.90591	1.62952	0.85498
17	IRISH INVESTMENT FUND	0.0448474	0.0238172	0.029734	1.88298	1.50827	0.80100
18	SWISS HELVETIA FUND	0.0442271	0.0240356	0.026437	1.84007	1.67290	0.90915
19	JAPAN QTC EQUITY FUND	0.0798827	0.0434208	0.046979	1.83973	1.70037	0.92425
20	UNITED KINGDOM FUND	0.0491958	0.0268796	0.029079	1.83023	1.69177	0.92435
21	GERMANY FUND	0.0692195	0.0380740	0.030568	1.81803	2.26441	1.24553
22	FUTURE GERMANY FUND	0.0578084	0.0324509	0.036171	1.78141	1.59821	0.89716
23	FIRST AUSTRALIA FUND	0.0537279	0.0313747	0.024834	1.71248	2.16352	1.26340
24	GROWTH FUND OF SPAIN	0.0467491	0.0273317	0.035770	1.71043	1.30693	0.76409
25	THAI FUND	0.0673030	0.0417380	0.046891	1.61251	1.43530	0.89010
26	INDIA GROWTH FUND	0.0511082	0.0321037	0.035580	1.59197	1.43722	0.90279
27	THAI CAPITAL FUND	0.0708192	0.0450254	0.073010	1.57287	0.96999	0.61670
28	TAIWAN FUND	0.0964076	0.0633112	0.075332	1.52276	1.27978	0.84043
29	ROC TAIWAN FUND	0.0720099	0.0525485	0.084309	1.37035	0.85412	0.62329
30	MEXICO FUND	0.0728115	0.0558739	0.064383	1.30314	1.13091	0.86783
31	TURKISH FUND	0.0721610	0.0731441	0.093552	0.98658	0.77135	0.78185
32	BRAZIL FUND	0.0741052	0.0824737	0.111304	0.89853	0.66579	0.74098

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